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Surface Water Drainage Calculations

Client:	Swift Homes Ltd
Architect:	Haywards Architects Ltd
Project:	Wood Street, Hinckley
Project No:	24-21614
Document No:	0-010
Issue:	Rev P1: Dec 2024
Status:	Preliminary
Date:	9th December 2024
Engineer:	LM

Issue Status:
A=Approval
B=Building Regulations
C=Construction
D=Draft
P=Preliminary
R=Review
T=Tender
Z=Final Construction

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	19.600	Add Flow / Climate Change (%)	0
Ratio R	0.402	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	19.000	0.190	100.0	0.010	4.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	11.000	0.110	100.0	0.015	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	7.400	0.080	92.5	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.003	13.000	0.130	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	4.200	0.050	84.0	0.003	4.00	0.0	0.600	o	150	Pipe/Conduit	
2.001	7.900	0.080	98.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.002	12.200	0.130	93.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.003	27.500	0.280	98.2	0.032	0.00	0.0	0.600	o	150	Pipe/Conduit	
3.000	15.100	0.160	94.4	0.035	4.00	0.0	0.600	o	150	Pipe/Conduit	
3.001	9.100	0.100	91.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	4.32	132.800	0.010	0.0	0.0	0.0	1.00	17.8	1.4
1.001	50.00	4.50	132.610	0.025	0.0	0.0	0.0	1.00	17.8	3.4
1.002	50.00	4.62	132.500	0.025	0.0	0.0	0.0	1.05	18.5	3.4
1.003	50.00	4.83	132.420	0.025	0.0	0.0	0.0	1.00	17.8	3.4
2.000	50.00	4.06	132.910	0.003	0.0	0.0	0.0	1.10	19.4	0.4
2.001	50.00	4.19	132.860	0.003	0.0	0.0	0.0	1.01	17.9	0.4
2.002	50.00	4.39	132.780	0.003	0.0	0.0	0.0	1.04	18.3	0.4
2.003	50.00	4.84	132.650	0.035	0.0	0.0	0.0	1.01	17.9	4.7
3.000	50.00	4.24	132.630	0.035	0.0	0.0	0.0	1.03	18.3	4.7
3.001	50.00	4.39	132.470	0.035	0.0	0.0	0.0	1.05	18.6	4.7

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
2.004	7.600	0.080	95.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.004	6.700	0.090	74.4	0.023	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.005	3.500	0.040	87.5	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
2.004	50.00	4.96	132.370	0.070	0.0	0.0	0.0	1.03	18.2	9.5
1.004	50.00	5.06	132.290	0.118	0.0	0.0	0.0	1.17	20.6	16.0
1.005	50.00	5.11	132.200	0.118	0.0	0.0	0.0	1.08	19.0	16.0

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1	133.850	1.050	Junction		1.000	132.800	150				
S2	133.850	1.240	Open Manhole	600	1.001	132.610	150	1.000	132.610	150	
S3	133.870	1.370	Open Manhole	600	1.002	132.500	150	1.001	132.500	150	
S4	133.870	1.450	Open Manhole	600	1.003	132.420	150	1.002	132.420	150	
S5	134.400	1.490	Junction		2.000	132.910	150				
S6	134.400	1.540	Open Manhole	600	2.001	132.860	150	2.000	132.860	150	
S7	134.520	1.740	Open Manhole	600	2.002	132.780	150	2.001	132.780	150	
S8	134.310	1.660	Open Manhole	600	2.003	132.650	150	2.002	132.650	150	
S9	134.000	1.370	Open Manhole	600	3.000	132.630	150				
S10	134.060	1.590	Open Manhole	600	3.001	132.470	150	3.000	132.470	150	
S11	134.050	1.680	Open Manhole	600	2.004	132.370	150	2.003	132.370	150	
								3.001	132.370	150	
S12	133.850	1.560	Open Manhole	600	1.004	132.290	150	1.003	132.290	150	
								2.004	132.290	150	
S13	133.900	1.700	Open Manhole	600	1.005	132.200	150	1.004	132.200	150	
Existing	134.060	1.900	Open Manhole	0		OUTFALL		1.005	132.160	150	

No coordinates have been specified, layout information cannot be produced.

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	150	S1	133.850	132.800	0.900	Junction	
1.001	o	150	S2	133.850	132.610	1.090	Open Manhole	600
1.002	o	150	S3	133.870	132.500	1.220	Open Manhole	600
1.003	o	150	S4	133.870	132.420	1.300	Open Manhole	600
2.000	o	150	S5	134.400	132.910	1.340	Junction	
2.001	o	150	S6	134.400	132.860	1.390	Open Manhole	600
2.002	o	150	S7	134.520	132.780	1.590	Open Manhole	600
2.003	o	150	S8	134.310	132.650	1.510	Open Manhole	600
3.000	o	150	S9	134.000	132.630	1.220	Open Manhole	600
3.001	o	150	S10	134.060	132.470	1.440	Open Manhole	600
2.004	o	150	S11	134.050	132.370	1.530	Open Manhole	600
1.004	o	150	S12	133.850	132.290	1.410	Open Manhole	600
1.005	o	150	S13	133.900	132.200	1.550	Open Manhole	600

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	19.000	100.0	S2	133.850	132.610	1.090	Open Manhole	600
1.001	11.000	100.0	S3	133.870	132.500	1.220	Open Manhole	600
1.002	7.400	92.5	S4	133.870	132.420	1.300	Open Manhole	600
1.003	13.000	100.0	S12	133.850	132.290	1.410	Open Manhole	600
2.000	4.200	84.0	S6	134.400	132.860	1.390	Open Manhole	600
2.001	7.900	98.8	S7	134.520	132.780	1.590	Open Manhole	600
2.002	12.200	93.8	S8	134.310	132.650	1.510	Open Manhole	600
2.003	27.500	98.2	S11	134.050	132.370	1.530	Open Manhole	600
3.000	15.100	94.4	S10	134.060	132.470	1.440	Open Manhole	600
3.001	9.100	91.0	S11	134.050	132.370	1.530	Open Manhole	600
2.004	7.600	95.0	S12	133.850	132.290	1.410	Open Manhole	600
1.004	6.700	74.4	S13	133.900	132.200	1.550	Open Manhole	600
1.005	3.500	87.5	Existing	134.060	132.160	1.750	Open Manhole	0

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Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.005	Existing	134.060	132.160	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	4
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.600	Storm Duration (mins)	30
Ratio R	0.402		

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S13, DS/PN: 1.005, Volume (m³): 0.6

Unit Reference	MD-SHE-0085-4000-1700-4000
Design Head (m)	1.700
Design Flow (l/s)	4.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	85
Invert Level (m)	132.200
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.700	4.0	Kick-Flo®	0.759	2.8
Flush-Flo™	0.372	3.4	Mean Flow over Head Range	-	3.2

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.5	1.200	3.4	3.000	5.2	7.000	7.8
0.200	3.2	1.400	3.7	3.500	5.6	7.500	8.0
0.300	3.4	1.600	3.9	4.000	6.0	8.000	8.3
0.400	3.4	1.800	4.1	4.500	6.3	8.500	8.5
0.500	3.4	2.000	4.3	5.000	6.6	9.000	8.8
0.600	3.3	2.200	4.5	5.500	6.9	9.500	9.0
0.800	2.8	2.400	4.7	6.000	7.2		
1.000	3.1	2.600	4.9	6.500	7.5		

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Storage Structures for Storm

Porous Car Park Manhole: S4, DS/PN: 1.003

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	13.9	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	133.720	Cap Volume Depth (m)	0.300

Complex Manhole: S10, DS/PN: 3.001

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	2.5
Max Percolation (l/s)	3.5	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	132.470	Cap Volume Depth (m)	0.300

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	2.5
Membrane Percolation (mm/hr)	1000	Length (m)	15.0
Max Percolation (l/s)	10.4	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	133.920	Cap Volume Depth (m)	0.300

Porous Car Park Manhole: S11, DS/PN: 2.004

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	6.9	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	133.970	Cap Volume Depth (m)	0.300

Complex Manhole: S12, DS/PN: 1.004

Cellular Storage

Invert Level (m)	132.310	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

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Cellular Storage

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	40.0	40.0	0.801	0.0	62.4
0.800	40.0	62.4			

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	17.5
Max Percolation (l/s)	24.3	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	133.720	Cap Volume Depth (m)	0.300

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1 year Return Period Summary of Critical Results by Maximum Outflow (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	4
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.700	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	S1	15 Winter	1	+0%					132.829
1.001	S2	15 Winter	1	+0%	100/15 Summer				132.656
1.002	S3	15 Winter	1	+0%	30/15 Winter				132.546
1.003	S4	15 Winter	1	+0%	30/15 Summer				132.465
2.000	S5	15 Summer	1	+0%					132.927
2.001	S6	15 Summer	1	+0%	100/15 Summer				132.877
2.002	S7	15 Winter	1	+0%	100/15 Summer				132.796
2.003	S8	15 Winter	1	+0%	100/15 Summer				132.700
3.000	S9	15 Winter	1	+0%	100/15 Summer				132.686
3.001	S10	15 Winter	1	+0%	30/15 Summer				132.527
2.004	S11	15 Winter	1	+0%	30/15 Summer				132.453
1.004	S12	15 Summer	1	+0%	30/15 Summer				132.407
1.005	S13	30 Winter	1	+0%	1/15 Summer				132.433

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1 year Return Period Summary of Critical Results by Maximum Outflow (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1	-0.121	0.000	0.08			1.5	OK*	
1.001	S2	-0.104	0.000	0.20			3.2	OK	
1.002	S3	-0.104	0.000	0.20			3.2	OK	
1.003	S4	-0.105	0.000	0.20		8	3.2	OK	
2.000	S5	-0.133	0.000	0.03			0.4	OK*	
2.001	S6	-0.133	0.000	0.03			0.4	OK	
2.002	S7	-0.134	0.000	0.03			0.4	OK	
2.003	S8	-0.100	0.000	0.24			4.1	OK	
3.000	S9	-0.094	0.000	0.30			5.1	OK	
3.001	S10	-0.093	0.000	0.31		5	5.1	OK	
2.004	S11	-0.067	0.000	0.59		12	9.2	OK	
1.004	S12	-0.033	0.000	0.20		14	3.5	OK	
1.005	S13	0.083	0.000	0.26			3.3	SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Outflow (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	4
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.700	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	S1	15 Winter	30	+0%					132.846
1.001	S2	15 Winter	30	+0%	100/15 Summer				132.691
1.002	S3	15 Winter	30	+0%	30/15 Winter				132.650
1.003	S4	15 Summer	30	+0%	30/15 Summer				132.609
2.000	S5	15 Summer	30	+0%					132.938
2.001	S6	15 Winter	30	+0%	100/15 Summer				132.886
2.002	S7	15 Winter	30	+0%	100/15 Summer				132.805
2.003	S8	15 Winter	30	+0%	100/15 Summer				132.751
3.000	S9	15 Winter	30	+0%	100/15 Summer				132.729
3.001	S10	15 Summer	30	+0%	30/15 Summer				132.654
2.004	S11	15 Summer	30	+0%	30/15 Summer				132.625
1.004	S12	15 Summer	30	+0%	30/15 Summer				132.606
1.005	S13	15 Winter	30	+0%	1/15 Summer				132.669

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30 year Return Period Summary of Critical Results by Maximum Outflow (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1	-0.104	0.000	0.20			3.6	OK*	
1.001	S2	-0.069	0.000	0.56			9.0	OK	
1.002	S3	0.000	0.000	0.56			9.0	SURCHARGED	
1.003	S4	0.039	0.000	0.55		21	8.9	SURCHARGED	
2.000	S5	-0.122	0.000	0.08			1.1	OK*	
2.001	S6	-0.124	0.000	0.07			1.1	OK	
2.002	S7	-0.125	0.000	0.06			1.1	OK	
2.003	S8	-0.049	0.000	0.72			12.4	OK	
3.000	S9	-0.051	0.000	0.75			12.6	OK	
3.001	S10	0.034	0.000	0.55		17	9.1	SURCHARGED	
2.004	S11	0.105	0.000	1.26		30	19.8	SURCHARGED	
1.004	S12	0.166	0.000	0.22		38	3.8	SURCHARGED	
1.005	S13	0.319	0.000	0.27			3.4	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Outflow (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	4
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.700	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	S1	15 Winter	100	+40%					132.950
1.001	S2	15 Summer	100	+40%	100/15 Summer				132.888
1.002	S3	15 Summer	100	+40%	30/15 Winter				132.885
1.003	S4	15 Summer	100	+40%	30/15 Summer				132.883
2.000	S5	15 Summer	100	+40%					133.060
2.001	S6	15 Summer	100	+40%	100/15 Summer				133.238
2.002	S7	15 Summer	100	+40%	100/15 Summer				133.242
2.003	S8	15 Summer	100	+40%	100/15 Summer				133.250
3.000	S9	15 Summer	100	+40%	100/15 Summer				133.329
3.001	S10	15 Winter	100	+40%	30/15 Summer				133.204
2.004	S11	15 Winter	100	+40%	30/15 Summer				133.078
1.004	S12	60 Winter	100	+40%	30/15 Summer				133.815
1.005	S13	120 Winter	100	+40%	1/15 Summer				133.856

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100 year Return Period Summary of Critical Results by Maximum Outflow (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1	0.000	0.000	0.37			6.5	SURCHARGED*	
1.001	S2	0.128	0.000	0.92			14.6	SURCHARGED	
1.002	S3	0.235	0.000	0.85			13.4	SURCHARGED	
1.003	S4	0.313	0.000	0.77		77	12.5	SURCHARGED	
2.000	S5	0.000	0.000	0.19			2.7	SURCHARGED*	
2.001	S6	0.228	0.000	0.21			3.3	SURCHARGED	
2.002	S7	0.312	0.000	0.23			3.8	SURCHARGED	
2.003	S8	0.450	0.000	0.96			16.4	SURCHARGED	
3.000	S9	0.549	0.000	1.18			19.9	SURCHARGED	
3.001	S10	0.584	0.000	1.16		89	19.0	SURCHARGED	
2.004	S11	0.558	0.000	2.15		104	33.7	SURCHARGED	
1.004	S12	1.375	0.000	0.26		134	4.5	FLOOD RISK	
1.005	S13	1.506	0.000	0.31			3.9	FLOOD RISK	

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